CERTIFIED PUBLIC ACCOUNTANT

FOUNDATION LEVEL 2 EXAMINATIONS

F2.3: INFORMATION SYSTEMS

DATE: TUESDAY 25, NOVEMBER 2025

MARKING GUIDE AND MODEL ANSWERS

QUESTION ONE

Sub question	Criteria	Marks
a)	2 marks for each explained category. If outlined only 1mark	8
b)	2 marks for the definition of hardware platforms	2
c)	1 mark for each outlined advantage	10
	Total	**20**

Detailed Answer

- **Discuss FOUR main categories of computers that can be used by John and Jacob.**
- **Microcomputers** are the most important category of computer for business people and consumers. Microcomputers are normally referred to as personal computers or PCs. Most microcomputers are called desktop computers as they are designed to sit on a desk. Another important type of microcomputer is the laptop, which is designed to suit those who want a portable computer.
- **Midrange computers,** including minicomputers and high-end network servers, are multi-user systems that can manage networks of PCs and terminals. Midrange computers can support hundreds of users and are popular as industrial processing control and manufacturing plant computers. Midrange computers have also become popular as powerful network servers to help manage large Internet websites and corporate Intranets.
- **Mainframe computers** are large, fast and powerful computing systems. These systems are normally found in large corporations who have significant transactions processing volumes or complex computational problems. Major International banks, airlines, oil companies and other large organizations used mainframe computers to process millions of sales transactions and customer enquires each day.
- **Supercomputers** are extremely fast computers that can perform hundreds of millions of instructions per second.
- **Mobile devices (Tablets and Smartphones):** Portable devices that offer flexibility and mobility. This will allow Jacob and John to access the trading system on-the-go, enhancing user engagement and responsiveness.

- **Servers:** High-performance machines designed to manage, store, and process data. These servers will mainly be used to host the trading platform, manage databases, and handle multiple user requests simultaneously.

b) Briefly explain what we mean by hardware platforms.

- Hardware platforms are platforms used to describe the hardware equipment on which the information system is installed.

c) Outline TEN advantages of cloud computing.

- New Technologies are easily accessible and cheap.
- It is not dependent on the physical location of either resources or users.
- Users access computing resources on their own and are not necessarily dependent on IT staff.
- It is based on standard network and Internet devices.
- Resources serve multiple users with computing virtually assigned according to need.
- Resources are increased or decreased according to demand.
- Charges are based on the amount of resources actually used.
- Large investments in IT infrastructure are not necessarily needed or investments are significantly reduced.
- Firms can shift additional processing requirements to cloud computing during peak business periods.
- It allows a more flexible IT infrastructure.

QUESTION TWO

Sub question	Criteria	Marks
a)	2 marks for each discussed component. Outline only is 1 mark	8
b)	2 marks for each discussed example. Outline only is 1 mark	6
c)	Each outlined challenge is 1 mark	3
d)	Each outlined step is 1 mark	3
	Total	**20**

Detailed Answer

- **Discuss at least FOUR components of an expert system referring to the above attendance management system.**
- **Knowledge base:** The knowledge base contains the knowledge of human's experts based on their experiences and knowledge built up over many years. The knowledge base also requires a set of rules that direct the use of the knowledge to solve specific problems in a particular domain.
- **Inference engine:** The inference engine is a computer that draws inferences from the results of applying the user supplied facts to the rules in the knowledge base. It then proceeds to the next fact-rule combination. The inference engine is considered the brain of the system.
- **User interface:** The user interface allows the user to communicate with the system. The system communicates with the user using a question and answer format. This communication drives the inference engine to match the symptoms of the problem with the knowledge in the base so that a conclusion is drawn and a recommendation is made to solve the problem.

- **Explanation facility:** This feature of the expert system gives it the ability to explain its recommendation.
- **Current Data storage:** This is a storage area set aside for input data related to the current problem.
- **Knowledge engineer:** The person who pulls the data from the human expert and fits it into the expert system is called the knowledge engineer.
- **Learning component:** The learning component enables the system to improve over time by analyzing patterns and outcomes. In AMS, it can adapt to changes in staff appearance or environmental conditions, enhancing the accuracy and reliability of face detection and attendance tracking.
- **Briefly discuss at least THREE examples of knowledge work systems.**

- **Computer-aided design tools** automate the creation and revision of designs, using computers and sophisticated graphics software. Computer-aided design applications are used by design engineers to build new products or improve old ones.
- **Virtual reality systems** have sophisticated visualization, and simulation capabilities that go far beyond conventional Computer-aided design systems. Virtual reality provides benefits in educational, scientific and business.
- **Virtual Reality Modelling Language** is a set of specifications for interactive 3-D modelling on the Web. Some companies are putting their training systems on the Internet so that people can have access to the latest information and can use it when they need it.
- **Investment workstations** are used in the financial sector to analyze trading situations instantaneously and facilitate portfolio management.
- **Geographic Information Systems (GIS):** aiding in decision-making processes related to urban planning, environmental management, and logistics. They provide insights into spatial patterns and relationships.

b) **Outline at least THREE challenges faced while implementing knowledge management systems.**

- **Resistance to change:** Employees may be reluctant to adopt new systems due to comfort with existing processes or fear of increased workload. Overcoming this resistance requires effective change management strategies and clear communication about the benefits of the new system.

- **Lack of leadership support:** Without strong backing from organizational leadership, KMS initiatives may lack the necessary resources and attention. Leaders must actively champion knowledge management efforts to ensure their success.

- **Poor data quality:** The effectiveness of a KMS depends on the accuracy and reliability of the data it contains. Inaccurate or outdated information can lead to poor decision-making and erode trust in the system.

- **Siloed information:** Information trapped within departmental silos can hinder collaboration and knowledge sharing. Breaking down these barriers requires fostering a culture of openness and implementing systems that facilitate cross-departmental communication.

- **Information overload:** An overwhelming amount of information can make it difficult for users to find relevant knowledge. Implementing effective categorization, search functionalities, and filtering mechanisms can help manage this issue.

- **Technological limitations:** Outdated or incompatible technology can impede the implementation of KMS. Ensuring that the chosen technology aligns with organizational needs and integrates well with existing systems is crucial for success.

c) **Outline at least THREE steps to be followed to obtain Values for knowledge management systems.**

1. **Identify Organizational Goals**

Align the KMS with the organization's strategic objectives. Understanding the goals ensures that the system supports key initiatives and delivers relevant outcomes.

2. **Engage Stakeholders**

Involve employees, managers, and other stakeholders in the design and implementation of the KMS. Their input ensures the system meets user needs and encourages adoption.

3. **Measure and Evaluate Performance**

Establish metrics to assess the effectiveness of the KMS. Regular evaluation helps identify areas for improvement and demonstrates the system's impact on organizational performance.

QUESTION THREE

Sub question	Criteria	Marks
a)	2 marks for each explained kind of organization change. Outline only is 1 mark	8
b)	2 Marks for the explanation	2
c)	1 mark for each explained perspective of feasibility study. Outline only is 0.5 mark	5
d)	1 mark for each explained category of fourth generation. Outline only is 0.5 mark	5
	Total	**20**

Detailed Answer

a) Discuss FOUR kinds of organization change that are enabled by information systems.

- **Automation** involves using computers to speed up the performance of existing tasks by eliminating the need for manual activity. This approach to organizational change may release staff to other jobs, reduce the number of employees needed, or enable the organization to process more transactions.

- **Rationalization of procedures** refers to the streamlining of standard operating procedures and eliminating some tasks in a process removing any blockages.

- **Business process reengineering** refers to the radical redesign of business processes. It can involve combining tasks in a process to cut waste and eliminating repetitive, labor- intensive tasks in order to improve cost and quality and to maximize the benefits of information technology.

- **A paradigm shift** is a radical change in the business and the organization. The strategy of the business can be changed and sometimes even the business the company is in.

- **Supply Chain Optimization:** information systems enhance supply chain management by providing real-time data on inventory levels, order status, and supplier performance. This allows organizations to optimize procurement, reduce lead times, and improve coordination across the supply chain, resulting in cost savings and improved service delivery.

b) Explain what we mean by Business Process Re-engineering.

Business process re-engineering is a management practice that aims to improve the efficiency of the business processes. Reengineering is a fundamental rethinking and radical redesign of business processes to achieve major improvements in performance, cost, quality, speed and service.

c) Discuss the FIVE perspectives of feasibility study in system investigation stage while developing an information system.

- **Financial feasibility:** This involves investigating the costs and benefits of the proposed system. The aim is to establish whether or not the proposed system is a good investment and if the organization can afford the expense.

- **Technical feasibility:** This relates to the ability of the organization to construct and implement the particular system in terms of expertise and knowledge of the technology involved. It is important to assess the IT departments' experience and skills in relation to systems development and the software and hardware being used.

- **Organizational feasibility:** This involves investigating how the new system or changes to the existing system will support the current and future business strategy, plans and objectives.

- **Operational feasibility:** This involves examining the ability of the organization to accept and use the new system. The issues that should be examined under operational feasibility include company culture and workforce skill and possible existing agreements with unions that could be impacted upon.

- **Schedule feasibility:** This looks at the time frame of the proposed development.

d) Briefly discuss FIVE categories of fourth-generation language tools.

Fourth-generation languages (4GLs) are designed to be closer to human language, making them more user-friendly for developers. The five categories include:

1. **Report generators:** These tools are used to create formatted reports from databases. They allow users to define the structure and content of reports without writing complex code.
2. **Form generators:** Form generators assist in creating user interfaces for data entry and retrieval. They provide graphical tools to design forms that interact with databases.
3. **Application generators:** These tools enable the rapid development of business applications by providing pre-built modules and templates. They reduce development time and complexity.
4. **Data management tools:** Data management 4GLs, such as SAS, SPSS, and Stata, provide sophisticated coding commands for data manipulation, file reshaping, case selection, and data documentation in the preparation of data for statistical analysis and reporting.
5. **Table-driven programming tools:** These tools allow developers to define logic and operations through tables rather than traditional coding. They are often used in business applications to simplify development and maintenance.

QUESTION FOUR

Sub question	Criteria	Marks
a)	2 marks for each explained example of electronic payment. Outline only is 1 mark	10
b)	Each outlined limitation of e-commerce is 1 mark	5
c)	1 mark for each explained category of m-commerce. Outline only is 0.5 mark	5
	Total	**20**

Detailed Answer

a) Describe briefly at least FIVE examples of electronic payment systems for e-commerce.

- **Digital credit card payment systems:** Secure services for credit card payments on the Internet that protect information transmitted among users, merchant sites, and processing banks
- **Digital wallet:** Software that stores credit card and other information to facilitate payment for goods on the Web
- **Accumulated balance payment systems:** Accumulate micropayment purchases as a debit balance that must be paid periodically on credit card or telephone bills

- **Stored value payment systems:** Enable consumers to make instant payments to merchants based on value stored in a digital account
- **Digital cash:** Digital currency that can be used for micropayments or larger purchases
- **Peer-to-peer payment systems:** Sends money using the Web to individuals or vendors who are not set up to accept credit card payments
- **Digital Checking:** Electronic check with a secure digital signature
- **Electronic billing presentment and payment systems:** Supports electronic payment for online and physical store purchases of goods or services after the purchase has taken place

b) **Although e-commerce has more advantages to businesses today, it also comes with challenges. Outline at least FIVE limitations of e-commerce.**

- Lack of universally accepted standards for quality, security and reliability
- Difficulty in integrating e-commerce software with some existing applications and databases
- Unresolved legal issues related to fraud and buyer and seller protection
- Customer resistance to changing from real to virtual stores
- Perception that e-Commerce is expensive and unsecured
- Increasing incidence of internet fraud and other crimes

c) **Discuss FIVE categories of m-commerce services.**

- **Information-based services:** Applications include instant messaging, e-mail, searching for a movie or restaurants using a smartphone or handheld device.
- **Transaction-based services:** Applications include purchasing concert tickets, music, or games. It includes searching for the best price for an item using a smartphone and buying it from an e-commerce site.
- **Financial Services:** Many banks now allow customer to use their mobile phone to check account balances, transfer funds between accounts and pay bills.
- **Location Based services:** Services that anticipate what a customer wants based on that person's location or data profile, such as traffic information and location of the closest hotels. There are many smartphone applications that offer services that enable mobile phone users to access relevant traffic information, calculate journey lengths, and search for nearby garages, hotels and restaurants.
- **Wireless Advertising:** In this form of marketing, a company will send a text based add to thousands of mobile users or tailor advertising on Web sites based on the location of the user when they access those sites.
- **Games and Entertainment:** Many mobile phone services offer downloadable digital games and ring tones. Many smartphone phone users can view TV programs, store digital music and download and watch video clips on their phone.

QUESTION FIVE

Sub question	Criteria	Marks
a)	Each outlined benefit of database management system is 1 mark	5
b) i	Definition of acquiring	2
ii	Definition of disseminating	2
iii	Definition of classifying	2
iv	Definition of standardizing	2
v	Definition of sharing information	2
c)	1 mark for each explained problem. Outline only is 0.5 mark	5
	Total	**20**

Detailed Answer

a) **Outline FIVE benefits of a database management system at Urumuri Inc. .**

- Reduce the complexity of the information systems environment
- Reduce data redundancy and inconsistency
- Eliminate data confusion
- Create program-data independence
- Reduce program development and maintenance costs
- Enhance flexibility
- Enable ad-hoc retrieval of information, improve access and availability of information
- Allow for the centralized management of data, their use, and security

b) **An information policy specifies the company's rules for acquiring, classifying, standardizing and sharing information, and includes procedures and roles. Discuss the terms below as used in information policy:**

   i. **Acquiring**: Acquisition is a process that involves collecting, measuring, and storing information from various sources for further analysis or processing. It helps ensure data confidentiality, integrity, and availability.
   ii. **Disseminating**: Data dissemination is the release of information obtained through a statistical activity. Data dissemination consists of distributing or transmitting statistical data to users.
   iii. **Classifying**: A data classification policy is primarily concerned with the management of information to ensure that sensitive information is handled well with respect to the threat it poses to an organization.

iv. **Standardizing**: Data standardization converts data into a standard format that computers can read and understand. This is important because it allows different systems to share and efficiently use data.

v. **Sharing information**: Information sharing means the exchanging, collecting, using or disclosing of information by one organization with another organization for certain purposes.

c) **Explain FIVE problems associated with the traditional file environment.**

- **Data redundancy** is the presence of duplicate data in multiple data files. In this situation, confusion results because the data can have different meanings in different files.
- **Program-data dependence** is the tight relationship between data stored in files and the specific programs required to update and maintain those files. This dependency is very inefficient, resulting in the need to make changes in many programs when a piece of data, has to be changed.
- **Lack of flexibility** refers to the fact that it is very difficult to create new reports from data when needed. Ad-hoc reports are impossible to generate and a new report may require programmers to modify the application so it can search the file for the particular information and output the report required.
- **Poor security** results from the lack of control over the data because the data are so widespread.
- **Data sharing** is virtually impossible because it is distributed in so many different files around the organization and each file can only be accessed by its own application.
- **Integrity and security issues:** Without centralized control, ensuring data integrity and security is challenging. Files may be prone to unauthorized access, accidental modifications, or loss, especially if proper backup and access control measures are not in place.

QUESTION SIX

Sub question	Criteria	Marks
a)	0.5 mark for each outlined characteristic	2
b)	1 mark for each explained functional perspective. Outline only is 0.5 mark	4
c)	2 marks for each explained competitive force. Outline only is 1 mark	8
d)	2 marks for each explained problem. Outline only is 1 mark	6
	Total	**20**

Detailed Answer

a) **Outline four characteristics of all functional perspective information systems such as the Mickey company system for managing employees.**

- Many small changes in a large database
- Systematic records
- Routine actions & updating
- Data preparation is a large & important effort

b) **Discuss the FOUR primary types of functional perspective information systems.**

- **Sales and marketing information systems**: assist the firm in marketing and sale of products and services to customers. An important operational system in this area is the sales order processing system which is used to capture customer orders.
- **Manufacturing and production information systems:** deal with the planning, development and production of products. An important system in this area is an inventory system which is used to provide information about the number of items held in inventory to support manufacturing and production activities.
- **Finance and accounting information systems** keep a record of the firm's financial assets and the flow of funds. The finance function is responsible for managing the firm's financial assets such as cash, shares and other investments.
- **Human resources information systems** maintain employee records, record employee skills, job performance and training, and assist planning of employee compensation and career development. An example of a system used in the human resources area would be a performance appraisal tracking system which is used to track details of each employee's performance evaluations.

c) **Describe at least FOUR competitive forces that shape the fate of the firm.**

- **Intensity of Rivalry between competitors:** Generally, the strongest of the five forces. Rivalry can be focused on such factors as; price, performance features, new product innovation, quality, durability, warranties, after-sale service and brand image.
- **Threat of new market entrants:** New companies have certain advantages, such as not being locked into old equipment, as well as disadvantages, such as less expertise and little brand recognition. Barriers to entry can include; economies of scale, capital costs, and access to supplier, distributors, expertise and customer loyalty.
- **Threat of Substitute products and services:** These are substitutes that customers might use if prices become too high. For example, Internet telephone services can substitute for traditional telephone services. The more substitute products and services available in an industry, the harder it is to control price and the lower profit margins will be as a result.

- **Bargaining power of Customers:** The power of customers grows if they can easily switch to a competitor's products and services, or if they can force a business and its competitors to compete on price alone where there is little product differentiation and all prices are known instantly (such as on the Internet).
- **Bargaining power of Supplier's:** The more different suppliers that are available to a firm, the greater control the firm can exercise over suppliers in terms of price, quality and delivery.

d) Discuss at least THREE common problems faced in Management Information Systems (MIS).

- **Lack of Strategy:** Many of the most common MIS issues can be traced back to a lack of a solid strategy. Information systems leaders are well aware of the many tools available to gather data on their network. But putting that information to use is often a challenge.

- **Meeting Organizational Needs:** MIS plays an ever-increasing role in organizations, with professionals relying on technology for every aspect of operations. Sales and marketing rely heavily on customer relationship software to track client interactions, for instance, while accounting needs its own software for billing, invoicing and financial tracking

- **Attracting and Retaining Top Talent:** For at least the past couple decades, the growth in technology has outpaced the number of people entering the field. The professionals most in demand include developers and programmers, database administrators and IT leaders and managers.

QUESTION SEVEN

Sub question	Criteria	Marks
a)	Each outlined element is 1 mark	5
b)	1 mark for each explained main type of system. Outline only is 0.5 mark	4
c)	1 mark for definition	1
d)	Each outlined capability is 1 mark	4
e)	Each outlined benefit of executive support system is 0.5 mark	1
f)	Each outlined benefit of group decision support system	5
	Total	**20**

Detailed answer

a) Outline the FIVE elements comprising the Business Intelligence environment.

Data sources: These are the origins of raw data, including internal systems like transactional databases and external sources such as market research. Accurate and diverse data sources are crucial for comprehensive analysis.

Data warehouse: A central repository that consolidates data from various sources, ensuring consistency and accessibility. It supports complex queries and analytics, enabling informed decision-making.

Business analytics tools: Software applications that analyse data to provide insights. These tools include statistical analysis, predictive modelling, and data mining techniques to uncover patterns and trends.

Business performance management: Processes and metrics that monitor and manage performance against objectives. It involves setting KPIs, dashboards, and scorecards to align operations with strategic goals.

User interface: The platform through which users interact with the BI system. It includes dashboards, reports, and visualization tools that present data in an understandable and actionable format.

b) Briefly discuss FOUR main types of systems that support decision-making.

- **Management Information Systems** help managers monitor and control the business by providing information on the firm's performance. They produce routine summary reports and exception reports for various purposes, based on date data extracted from transaction processing systems. Examples include sales performance and inventory control. Management Information Systems are mainly focused on supporting routing structured decision making.
- **Decision Support System** is a computer system that supports managers in decision-making tasks. Decision Support Systems are particularly suited to non-routine decision-making.
- **Executive Support Systems** are computerized systems designed specifically to meet the information need of senior executives.
- **Group Decision Support System** is an interactive computer-based system that facilitates the solution of unstructured problems by a set of people working together as a group. Group Decision Support System have been developed in response to the growing concern over the quality and effectiveness of meetings. Artificial Intelligence Systems
- **Utilize machine learning** and algorithms to analyse data and make decisions. These systems can identify patterns and make predictions, supporting decisions in areas like customer service and operations.

c) Define Customer Decision-Support System.

A customer decision-support system supports the decision-making process of the organization's existing and potential customers. The data can come from both internal and external sources, including enterprise systems and the Web. The Web and Internet can provide online access to various database and information pools along with software for data analysis.

d) **Outline FOUR capabilities of Executive Support Systems.**

- They are specifically tailored to the needs of the senior executive.
- They provide access data on specific issues and problems of interest to the executive as well as general reports.
- They provide a range of on-line analysis tools including trend analysis, exception reporting and drilldown capacity.
- They access a range of internal and external data.

e) **Give TWO benefits of Executive Support Systems.**

- Executive support systems provide information to the executive.
- There is no need for intermediaries to prepare the information in a format suitable for the executives' requirements.
- The executive gets the information immediately from the Executive Support Systems.
- The information is also not influenced by the views of the intermediary.
- The monitoring facility of an Executive Support System allows executives to monitor their own areas of responsibility more successfully.
- The system can warn when there are problems, allowing the executive more time for other tasks.

f) **Outline FIVE benefits of the Group Decision Support System.**

- Group decision support system enables more people to attend and participate in a meeting, and at the same time can increase meeting productivity. This increase in productivity is realized since the attendees can contribute simultaneously
- A group decision support system can guarantee anonymity
- Group decision support system follow structured methods for organizing and evaluating ideas
- Group decision support system preserve the results of meetings
- Group decision support system increase the number of ideas generated and the quality of decisions made, while producing the desired results in fewer meetings
- A Group decision support system can support idea generation, complex problem analysis and large groups

END OF MODEL ANSWERS AND MARKING GUIDE